

cattle, the necessity for large increase of capital, the increased competition in the supplies of corn, live stock and preserved meats, make the science and practice of agriculture a difficult, but also more than ever a progressive one. It is not possible to retreat. To be a successful farmer it requires a far seeing, hard-headed, cautious, yet resolute and courageous policy,

2. THE STUDY OF NATURE.

A school in the country, especially in a farming district, ought to aim to give the pupil a good knowledge of the natural objects which come under the eye of every one of common observation. To do this it is necessary to have a teacher who is competent to interest, a teacher who knows and is capable of imparting instruction and of creating an interest and a spirit of inquiry in the minds of his pupils. We hope the time is coming when the children of our schools will know the names and the properties of the plants, the trees, the minerals, and the animals that come within the range of their daily observation. Every farmer's boy ought to have the advantage of this kind of instruction. It adds vastly to the happiness of life and does much to impart the power of intelligent observation in which most people are wonderfully deficient.—*Massachusetts Ploughman.*

3. KINDNESS TO ANIMALS.

From the time the colt is born he should be taught to regard man, whom he is afterwards to serve, as his protector and friend. A human hand should first lift him gently to his feet, and direct his little mouth to the source of maternal nourishment. With the human touch he should thus early be made to associate caresses and a supply for all his wants. Instead of yells and oaths, the kicks and blows, he should hear only gentle, loving tones from the attendant's mouth, and pattings from his kindly palm. He should be taught to expect and watch for man's entrance to the stall or paddock where he is kept, as a dog waits for the coming of the master, as the season of joy and happiness. His little deer-like limbs should be handled, and he be taught to yield them properly, and without fear, to the master's touch. In short, everything that loving ingenuity can devise should be done to impress upon his mind thus early in life that man is his natural protector and friend, between whom and him an intimate companionship has been ordained by beneficent Nature, which ensures that he shall be protected and cherished while he serves. The horse has a heart-claim upon us. The young colt is, in some sense, a member of the family—one of the owner's household second in rank and dignity only to the children. So the Arab regards him. The beautiful young thing, with its shining coat and gazelle eyes and sprightly antics; so full of bounding but docile life, is literally his children's playmate. He shares their food, and often their sleeping mat; and a blow dealt him is as promptly resented as if it had been dealt the only son, for whose service in peace and safety in the hour of battle, the young thing is being raised.—*From Mr. Murray's Book on "The Perfect Horse."*

4. OUR FEATHERED FRIENDS.

The insect tribe are the bane of Canadian fruit culture; they spoil our cherries, sting our pears and apples, and render them worthless, blight our plum trees before they can produce mature fruit, perforate our grapes, destroy the beauty of our roses, devour our green vegetables, and otherwise entail no end of mischief. All this is due to man's own improvidence, in the constant and wanton destruction of the birds, which are the natural enemies of the insects, and the indefatigable friends of the farmer and fruit culturist. During many years past there has been a steady decrease in the number of our native birds in all parts of the country where man has formed his settlements, and a consequent increase in the number of insects. This subject is dealt with in an interesting manner in a prize essay just published by Mr. Frank H. Palmer of Boston. The pamphlet contains a list of the birds which feed on insects. Of the insects hurtful to garden vegetables he makes thirty different species; of the enemies of the grape about fifty; of those injurious to the apple and apple tree seventy-five. Shade trees have a hundred kinds of insect enemies, and wheat and other grains fifty. We therefore require a very considerable army of birds to protect our various crops from the ravages of these pests, and there seems to be every reason for the enforcement of these laws which we have enacted for their protection, but which are seldom if ever administered. The essayist remarks that, next to the law, the most important measure for the protection of the birds is the putting up of accommodations for them, and thus inducing them to settle. Every one who has half an acre of land should have two or three pairs of birds nesting thereon. Swallows, blue-birds, sparrows, wrens, and other birds eagerly avail themselves of the most simple

and inexpensive accommodations, which are just as satisfactory and comfortable to them as the most elegant and costly ornamental houses. No one need be prevented, from the fear of expense, from furnishing dwelling places, rent free, to these useful and interesting tenants. With a few simple tools and a box or two, which may be had of any grocer, a bird-house may be made of almost any size or shape desired. Should you wish it highly ornamental, nothing is better then to cover it with rustic work, which may be done with the aid of a wild grapevine, cut in pieces of the right length and nailed on. Such a bird-house costs little or nothing, save the time required to make it; and this slight expense will be amply repaid by the satisfaction of doing a good deed. There are other contrivances which may be prepared and put up in five minutes, and will serve as well as anything else. The writer says:—"At the opening of the present season we put up four tin cans, such as are used for canning tomatoes, having first filed a small hole in the lower end to prevent the collection of water. Three of the four were immediately occupied by bluebirds. One pair laid five eggs, four of which hatched, and the young grew to maturity. The other two pairs each had two broods, four eggs to each brood, and all hatched; but three of the young died before growing up. Seventeen young bluebirds and their parents, six in number—twenty-three insect-eating birds were thus induced to make their home in our orchard, the parent birds for about five months, and the young say about three months. Certainly, at a very low estimate, each bird would average twenty insects a day; for the food of these birds consists entirely of insects. At this rate the old birds would have destroyed during their stay here eighteen thousand insects, and the young thirty thousand six hundred—which gives a total of forty-eight thousand six hundred insects destroyed from our own and our neighbours' trees; and it did not take half an hour to prepare and put up these simple accommodations." Purple martins and other members of the swallow tribe will readily occupy boxes put up for their use. A pair of bluebirds found a happy home in an old beaver hat which had blown up and lodged in an apple tree. A good bird-house may be made of a medium-sized flower pot, with the hole somewhat enlarged and the top covered with a board. Will not every one who has a dozen rods land make a bird-house of some kind, and thus help to restore the proper proportions of the feathered and insect races?—*London Free Press.*

VIII. Mathematical Department.

Toronto, 4th April, 1874.

To the Editor of the *Journal of Education.*

SIR,—Mr. Glashan, Public School Inspector for the County of Middlesex, has favoured me with two solutions of the 10th problem of the First Class Algebra paper of last July. As it seemed to me that it might be of service to teachers to have an opportunity of observing the methods which Mr. Glashan employs, I asked permission to publish his solutions. This he has granted; and I therefore send you his solutions, requesting that you will give them a place in the *Journal of Education*. Mr. Glashan states, that either of his solutions "should easily be understood by a properly trained Second-Class Candidate;" and, to prevent any difficulty being felt, he has given the steps in full. The first four steps are common to both proofs.

From the Cambridge Examination papers, "First Three Days," 1849, Mr. Glashan quotes the following, which is a particular case of the more general problem in our First-class paper of last July: "Find a whole number which is greater than three times the integral part of its square root by unity. Show that there are two solutions of the problem, and only two."

I have the honour to be, Sir,

Your obedient Servant,

GEORGE PAXTON YOUNG.

"Find a number which is greater by unity than n times the integral part of its square-root; n being a whole number."

1° Let x be "the integral part of its square-root,"

2° $\therefore$ the No. is $nx+1$

3° and it is included amongst

4° $x^2, x^2+1, x^2+2, x^2+3, \dots (x+1)^2-1$

5° But x^2 may be thrown out at once, for

6° $x - \frac{1}{x}$ is a fraction

7° and n is an integer,

8° $\therefore x - \frac{1}{x}$ cannot = n